#37

Pine Gall Rust

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PINE GALL RUST

The pine gall rust disease is common wherever lodgepole pine or shore pine (*Pinus contorta*) grow in southeast Alaska. It may also be found on Mugo pine and other exotic pines grown as ornamental trees in Alaska. No other tree species or vegetation is known to be directly affected by this disease. Although pine gall rust is quite noticeable, it is usually not very damaging and frequently is easy to control. This leaflet will familiarize you with the tree disease, briefly explain the biology of the causal fungus, and provide ideas for reducing damage to pine.

Identification

Pine gall rust is caused by the rust fungus *Endocronartium harknessii*. The disease is simple to identify because it causes swollen, spherical growths on the branches or main bole of pine trees (cover) These galls are composed of pine tissue and range in size from less than an inch to about one foot in diameter. In spring, the rust fungus produces abundant orange spores in the fissures of the gall (Fig. 1) which ensures proper diagnosis of the disease.

Life history

The rust fungus spreads by means of its microscopic spores. Spores are produced in orange masses on galls in spring and are dispersed on air currents. Spores then germinate and infect pines through needles or young twigs. No other host plants are needed for the rust fungus to complete its life cycle. Once the fungus has grown inside pine branches, it does not immediately kill tissues. Rather, it takes control of the tree's growth

hormones and cause extra growth in the vicinity of the infection. After several years, this results in the formation of a woody gall with a diameter larger than the surrounding branch or bole. You can see this by cutting through the gall to observe the swollen growth rings compared to those rings in the branch. Each spring, the fungus produces more microscopic orange spores which can infect other pines, thereby continuing the life cycle of the fungus.

Figure 1. During spring, the rust fungus produces its infectious spores in an orange dry mass in the fissures of the pine gall.

Figure 2. Gall rust on the main bole of a pine tree.

Damage

The amount of damage caused by pine gall rust depends upon the number, size, and location of galls on the tree, and how unsightly you think they are. Generally, pines can tolerate several galls without tree health being adversely affected. Galls on the main bole (Fig. 2), however, are more disruptive to the tree's physiology and have more effect on tree growth and survival.

Galls on branches or the main bole frequently remain alive for many years. A more serious condition occurs when galls die. This can

result from growth of the rust fungus or when galls are attacked by another fungus, *Nectria macrospora* (Fig. 3). The *Nectria* fungus is known to kill fast-growing nutritious tissues such as pine rust galls. When a gall dies, nutrients are no longer carried to the outer portions of the branch. The branch dies from the gall outward and needles turn brown (Fig. 4). The top of a pine tree sometimes dies when a gall along the main bole is killed. If your pine has dead branches or a dead top, look carefully along the branch or the bole and you will probably find a pine rust gall. Although the *Nectria* fungus is not present for long, you may see the clustered bright reddish fruiting bodies (each less than 1/32 inch diameter) of this damaging fungus (Fig. 3).

Figure 3. The combination of pine gall rust and another fungus, Nectria macrospora, *can kill the pine galls. This results in branch death, so commonly seen on pines.*

Figure 4. When the gall dies from the rust fungus or attack by secondary fungi, the branch or top of the tree from the gall outward or upward is sure to die.

Control

The simplest form of control is to prune away branches that have galls. Tissues far from the gall do not have to be removed as the rust fungus does not penetrate very far from the swollen gall. Pruning infections in this way may decrease future disease in pines by slightly reducing the number of infectious fungal spores produced each year. For controlling the disease, these branches need not be disposed

of in any particular way because the fungus will die as soon as the pine branch material dies. When pruning away dead galls, however, the pine material should probably be burned or moved away from pines because it may contain the *Nectria* fungus, which can survive and produce infectious spores on dead pine material.

Controlling a large gall on the main bole of pines will present more of a problem. Removing the gall and the top of the tree will probably cause the tree to appear malformed, even many years after pruning.

Pesticides may be effective for controlling the spread of both the rust and *Nectria* fungus, but they are probably unnecessary and techniques for their use on this disease have not been determined.

Many diseases can be reduced by enhancing tree growth and vigor by adding fertilizer or extra watering. Evidence from British Columbia suggests, however, that the rust fungus is more likely to attack the fastest growing pines. Thus, fertilizing cannot be relied upon to control the disease and may actually aggrevate the problem.

Doing nothing to control pine gall rust might be best for the pine tree. Unless galls are very numerous or on the main bole, they may have only negligible effect on the health of pines.

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Additional information on this disease can be obtained from your local USDA Cooperative Extension Service office, Alaska State Forestry office, or from:

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